Wimmerella, a New South African Genus of Lobelioideae (Campanulaceae)

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ABSTRACT. The 10 South African species currently assigned to *Laurentia* (an otherwise Mediterranean genus) are segregated here as the genus *Wimmerella* on the basis of their basal (vs. medial) bracteoles; larger flowers and fruits; and subglobose (vs. ellipsoid) seeds lacking a strophiole, which are sulcate with flattened (vs. keeled) walls.

Laurentia Adanson, as circumscribed by Wimmer (1953, 1968), was a genus of oddly discontinuous distribution. Its 27 species were restricted to either the Mediterranean region (3 spp.), South Africa (10 spp.), Australia (10 spp.), western North America (3 spp.), or the West Indies (1 sp., spread in historic times throughout much of the tropics). Phytogeographic coherence of the infrageneric taxa recognized in Wimmer's treatment was no better. The Mediterranean and South African species and two of the species from North America were assigned to section *Laurentia*; the remaining North American endemic to section *Palmerella* (A. Gray) E. Wimmer; and the Australian and West Indian species to section *Isotoma* (R. Brown) Endlicher.

However, this very broadly construed *Laurentia* was something of an innovation with Wimmer. Many of the species had been assigned to smaller genera by earlier authors, and that is the classification preferred by most current workers (e.g., McVaugh, 1940a, 1943; Mason, 1957; Melville, 1960; McComb, 1970; Elliot & Jones, 1990; Chapman, 1991; Skog, 1991; Lammers, 1993; Morin, 1993; Kartesz, 1994). Here, the Australian species comprise *Isotoma* (R. Brown) Lindley, the sole West Indian species is segregated as *Hippobroma* G. Don, and the North American species are assigned to *Porterella* Torrey and *Palmerella* A. Gray. As noted by Lammers (1997), this leaves only the Mediterranean and South African species in *Laurentia*. The present paper executes the final dismemberment of *Laurentia*, by segregating the species of these two regions into separate genera.

Evidence supporting the generic distinctness of the Mediterranean and South African species was provided in detail by Serra and Crespo (1997) and Crespo et al. (1998). These authors placed particular emphasis on differences in seed morphology: seeds of the South African species are subglobose, lack a strophiole, and are sulcate with flattened walls; those of the Mediterranean species are ellipsoid, strophiolate, and sulcate with keeled walls. The extreme value of seed features in Lobelioideae was first stressed by McVaugh (1936, 1940b) and recently expanded upon by Murata (1992, 1995). The two groups of species were also distinguished by bracteole position (basal in South Africa, medial in the Mediterranean) and by the larger flowers and fruits of the former. Furthermore, in the Mediterranean species, the plants are erect and the flowers solitary in an axillary position (appearing terminal in rosulate species). In contrast, the South African species have decumbent stems with solitary axillary flowers; or if the stems are erect, then the flowers are borne in a 2–15-flowered terminal raceme. As these differences are consonant with differences used to distinguish genera in the subfamily, Serra and Crespo (1997) and Crespo et al. (1998) recognized the Mediterranean and South African species as two distinct genera.

But what names should these genera bear? Meikle (1979) published a brief note contending that the name *Laurentia* was a superfluous renaming of *Lobelia*. In its place, he adopted the name *Solenopsis* C. Presl. Recently, however, Lammers (1997) presented evidence that *Laurentia* was not illegitimate, and formally proposed that the name be conserved to ensure stability. The type of *Laurentia* is

Lobelia laurentia L. [≡ *Solenopsis laurentia* (L.) C. Presl, = *Laurentia gasparrinii* (Tineo) Strobl], while the lectotype of *Solenopsis* (designated by Pfeiffer, 1874: 1192) is *Lobelia minuta* L. [≡ *Solenopsis minuta* (L.) C. Presl, ≡ *Laurentia minuta* (L.) A. DC.]. Both species belong to the Mediterranean genus, which will thus be called either *Laurentia* or *Solenopsis*, depending on the outcome of Lammers's (1997) proposal.

For the South African genus, Serra and Crespo (1997) and Crespo et al. (1998) took up the name *Enchysia* C. Presl, which had been cited as a synonym of *Laurentia* by Wimmer (1953). When published by Presl (1836: 40), *Enchysia* included six species. One of these, *E. scapigera* (R. Brown) C. Presl, is now treated (Elliot & Jones, 1990; Chapman, 1991) as a member of the Australian genus *Isotoma* [i.e., *I. scapigera* (R. Brown) G. Don], while three others (*E. baueri* C. Presl, *E. gaudichaudii* C. Presl, and *E. lessonii* C. Presl) are all synonyms of the related *I. fluviatilis* (R. Brown) F. Mueller ex Bentham (McComb, 1970). The last two of the six original species were from South Africa, but are not referable to *Laurentia* sensu Wimmer (1953, 1968). *Enchysia repens* (Thunberg) C. Presl (based on *Lobelia repens* Thunberg) is a synonym of *Lobelia anceps* L. f. (Thulin, 1983), while *Enchysia erinoides* (L.) C. Presl (based on *Lobelia erinoides* L.) is a synonym of *Lobelia erinus* L. (Thulin et al., 1986). Because it was this last species, *L. erinoides*, that was designated as the lectotype of *Enchysia* by Pfeiffer (1874: 1199), that generic name is properly a synonym of *Lobelia* L. and cannot be used for the South African species formerly assigned to *Laurentia*. Even if Pfeiffer's choice were to be overturned, there is no way to lectotypify this name that would permit its use for South African *Laurentia*; if it is not a synonym of *Lobelia*, it will be a synonym of *Isotoma*.

A thorough survey of all generic names referable to Lobelioideae shows that none can be typified on the basis of one of the South African species of *Laurentia*. Therefore, a new genus is erected to accommodate these species. The key below may be used to distinguish the new genus from its allies.

KEY TO THE GENERA INCLUDED IN *LAURENTIA* S.L.

1a. Corolla scarcely zygomorphic; filament tube fully adnate to the corolla.
  2a. Calyx lobes 2–10 mm long; corolla 8–30 mm long; filament tube 3–20 mm long; anther tube black, the ventral two setose at apex (Australia) . . . . . *Isotoma*
  2b. Calyx lobes 10–22 mm long; corolla 60–150 mm long; filament tube 55–145 mm long; anther tube white, all five setose at apex (pantropical weed, originally endemic to West Indies) . . . . . *Hippobroma*
1b. Corolla distinctly bilabiate, the dorsal lip 2-lobed, the ventral 3-lobed; filament tube free from corolla, or only the two dorsal filaments adnate.
  3a. Corolla 20–30 mm long; filament tube 9.5–17 mm long, the two dorsal filaments adnate to the corolla (western North America) . . . . . *Palmerella*
  3b. Corolla 3–20 mm long; filament tube 1.5–7 mm long, free from corolla.
    4a. Stems fleshy; calyx lobes 3–8(–11) mm long; capsules 5–10(–16) mm long; seeds ca. 1 mm long (western North America) . . . . . *Porterella*
    4b. Stems herbaceous; calyx lobes 1–4 mm long; capsules 1–6 mm long; seeds 0.3–0.5 mm long.
      5a. Stems erect, the flowers solitary and axillary or terminal; pedicels with 1–3 bracteoles near the middle; filament tube 1.5–2.5 mm long; capsules 1–3 mm long; seeds ellipsoid, strophiolate, sulcate with keeled walls (Mediterranean region) . . . . . *Solenopsis* (= *Laurentia*, nom. cons. prop.)
      5b. Stems decumbent, the flowers solitary and axillary, or if erect, the flowers 2–15 in a terminal raceme; pedicels bibracteolate at base; filaments 2–6 mm long; capsules 2.5–6 mm long; seeds subglobose, lacking a strophiole, sulcate with flattened walls (South Africa) . . . . . *Wimmerella*

Wimmerella L. Serra, M. B. Crespo & Lammers, gen. nov. TYPE: *Wimmerella secunda* (L. f.) L. Serra, M. B. Crespo & Lammers.

A *Solenopsis* (= *Laurentia* s. str.) bracteolis basalibus, floribus capsulisque majoribus, atque seminibus subglobosis strophiolo destitutis testa sulcata cum parietibus applanatis differt.

Annual or perennial plants up to 30(–40) cm high. Stems decumbent or erect, simple or branched, glabrous or pubescent. Leaves cauline, alternate, in some species only rosulate, sessile or petiolate; lamina orbicular to linear, entire or with 5–9 teeth or lobes, 3–40 mm long, 2–12 mm wide. Flowers solitary in leaf axils or (in plants with erect stems) 2–15 in terminal racemes up to 25 cm long; bracts linear to lanceolate, 5–30 mm long, 1–3 mm wide; pedicels (2–)5–20 mm long in fruit. Calyx lobes oblong, lanceolate or linear-lanceolate, entire, 1–3 mm long, glabrous or pubescent. Corolla white or blue (sometimes with a white patch in the throat), 3–18 mm long, bilabiate with 2 linear dorsal lobes and 3 oblong ventral lobes or nearly regular with 5 subequal linear-oblong lobes, glabrous; tube funnel-shaped or tubular. Staminal column free from

the corolla; filaments 2–6 mm long; anther tube 0.8–1 mm long, light black, glabrous or short pubescent distally, bisetose at the apex of the ventral pair. Ovary inferior, bilocular; placentation axile. Capsule apically dehiscing via two valves, 2.5–6 mm long, the calyx persistent. Seeds subglobose, lacking a strophiole, light brown, smooth and lustrous, 0.4–0.5 mm long, sulcate with flattened walls.

Wimmerella is endemic to South Africa. Populations occupy diverse habitats from the coastal regions to the central plateaus, at elevations from sea level up to 1800 m. After study of over 100 specimens (see Acknowledgments for herbaria), it was decided to follow the treatment of Wimmer (1953, 1968) and Welman (1993), in which 10 species are recognized. All are confined to the Cape Province with the exception of *W. arabidea*, which also occurs in Natal (Welman, 1993).

The names of two species originally described by Wimmer (1968) and recognized by Welman (1993) were not validly published. Wimmer failed to designate a type as defined by Article 8.1 of the *Code* (Greuter et al., 1994), an oversight perhaps attributable to the fact that his manuscript was not published until seven years after his death. Two duplicates of one gathering were cited for each name without singling one out as the holotype, thus violating Article 37.3. These two species are here named by designating a holotype and providing an explicit reference to Wimmer's (1968) effectively published Latin diagnosis, as allowed by Article 32.4. [See note added in proof.]

Etymology. The genus is named for Franz Elfried Wimmer (1881–1961), the Austrian botanist and Roman Catholic priest who was the foremost twentieth century student of the Lobelioideae (Rechinger, 1961). The honorific is rendered as a diminuitive to avoid homonymy with *Wimmeria* Schlechtendal (Celastraceae) and to parallel the related genera *Palmerella* and *Porterella*.

KEY TO THE SPECIES OF *WIMMERELLA*

1a. Leaves suborbicular or cordate-reniform.
  2a. Stems erect or decumbent, glabrous; pedicels 2–7 mm long; corolla 3 mm long . . . . . *W. frontidentata*
  2b. Stems decumbent or prostrate, pubescent; pedicels 8–18 mm long; corolla 3–8 mm long.
    3a. Leaves very sparsely pubescent with trichomes ca. 0.4 mm long, the margin 5–9-toothed (rarely subentire) . . . . . *W. pygmaea*
    3b. Leaves densely pubescent with trichomes ca. 0.2 mm long, the margin 5–9-lobed.
      4a. Pedicels 8–11 mm long, pubescent throughout; corolla 3–4 mm long . . . . . *W. hederacea*
      4b. Pedicels 12–18 mm long, glabrous or pubescent only at the base; corolla 6–8 mm long . . . . . *W. hedyotidea*
1b. Leaves lanceolate, linear-lanceolate, lanceolate-spatulate, or oblong-spatulate.
  5a. Leaves pubescent (rarely glabrous); bracts oblong or linear, longer than the pedicel; corolla white, 4–7 mm long . . . . . *W. secunda*
  5b. Leaves glabrous; bracts linear, up to half the length of the pedicel; corolla blue, sometimes with a white patch in the throat, 6–18 mm long.
    6a. Corolla 18 mm long . . . . . *W. longitubus*
    6b. Corolla 6–12 mm long.
      7a. Leaves oblong-spatulate, incised-dentate; corolla 11–12 mm long . . . . . *W. giftbergensis*
      7b. Leaves linear-lanceolate or lanceolate-spatulate, entire or denticulate; corolla 6–10 mm long.
        8a. Leaves linear-lanceolate; corolla 6 mm long; capsule 2.5 mm long . . . . . *W. mariae*
        8b. Leaves lanceolate-spatulate; corolla (6–)7–10 mm long; capsule 4 mm long.
          9a. Leaves 5–10 mm long; inflorescence 2–5-flowered . . . . . *W. bifida*
          9b. Leaves 10–30 mm long; inflorescence 5–15-flowered . . . . . *W. arabidea*

Wimmerella arabidea (C. Presl) L. Serra, M. B. Crespo & Lammers, comb. nov. Basionym: *Rapuntium arabideum* C. Presl, Prodr. Monogr. Lobel. 18. 1836. *Laurentia arabidea* (C. Presl) A. DC., in DC., Prodr. 7: 410. 1839. *Lobelia arabidea* (C. Presl) Steudel, Nomencl. Bot. (ed. 2) 2: 59. 1841. TYPE: South Africa. Cape Province: "Cap B. Sp. in parte inferiore occidentali," *Anonymous s.n.* (lectotype, designated by Wimmer (1968: 853), PR not seen).

Wimmerella bifida (Thunberg) L. Serra, M. B. Crespo & Lammers, comb. nov. Basionym: *Lobelia bifida* Thunberg, Prodr. Fl. Cap. 40. 1794. *Rapuntium bifidum* (Thunberg) C. Presl, Prodr. Monogr. Lobel. 30: 1836. *Laurentia bifida* (Thunberg) Sonder, in Harvey & Sonder, Fl. Cap. 3: 552. 1865. TYPE: South Africa. Cape Province: "Am Rande des Berges Bockland," *Thunberg s.n.* (lectotype, designated by Wimmer (1953: 394), UPS not seen).

Wimmerella frontidentata L. Serra, M. B. Crespo & Lammers, sp. nov. TYPE: South Africa. Cape Province: Swellendam Div., Anysberg, sheltered S side rocks, 1600 m, 21 May 1950, *Esterhuysen 17070* (holotype, PRE; isotype, BOL). [Validated by reference to the effectively published Latin description of "Laurentia frontidentata" E. Wimmer, Pflanzenr. IV.276c: 855. 1968, nom. invalid.]

Wimmerella giftbergensis (E. Phillips) L. Serra, M. B. Crespo & Lammers, comb. nov. Basionym: *Lobelia giftbergensis* E. Phillips, Ann. S. African Mus. 9: 121. 1913. *Laurentia giftbergensis* (E. Phillips) E. Wimmer, Repert. Spec. Nov. Regni Veg. 38: 77. 1935. TYPE: South Africa. Cape Province: Van Rhynsdorp Div., Giftberg Range, 1000–2000 ft., Sep. 1911, *Phillips 7599* (holotype, K).

Wimmerella hederacea (Sonder) L. Serra, M. B. Crespo & Lammers, comb. nov. Basionym: *Laurentia hederacea* Sonder, in Harvey & Sonder, Fl. Cap. 3: 553. 1865. TYPE: South Africa. Cape Province: "C. B. S., Hab. Eastern frontier," *Hutton s.n.* (holotype, K).

Wimmerella hedyotidea (Schlechter) L. Serra, M. B. Crespo & Lammers, comb. nov. Basionym: *Laurentia hedyotidea* Schlechter, Bot. Jahrb. Syst. 27: 197. 1899. TYPE: South Africa. Cape Province: in regioni austro-occidentali, in saxosis montium pone Bainskloof, in ditione Ceres, alt. ca. 4000 ped., 11 Nov. 1896, *Schlechter 9104* (lectotype, designated by Wimmer (1953: 396), B not seen; isolectotype, K).

Wimmerella longitubus (E. Wimmer) L. Serra, M. B. Crespo & Lammers, comb. nov. Basionym: *Laurentia longitubus* E. Wimmer, Repert. Spec. Nov. Regni Veg. 22: 193. 1926. TYPE: South Africa. Cape Province: Cape of Good Hope, in humidis Langebergen prope Riversdale, *Schlechter 1902* (holotype, WU not seen).

Wimmerella mariae L. Serra, M. B. Crespo & Lammers, sp. nov. TYPE: South Africa. Cape Province: Worcester Div., plateau between Matroosberg and Sonklip Peak, in dry mud on floor of small pans, ca. 1800 m, 17 Jan. 1959, *Esterhuysen 28132* (holotype, BOL; isotype, W not seen). [Validated by reference to the effectively published Latin description of "Laurentia mariae" E. Wimmer, Pflanzenr. IV.276c: 854. 1968, nom. invalid.]

Wimmerella pygmaea (Thunberg) L. Serra, M. B. Crespo & Lammers, comb. nov. Basionym: *Lobelia pygmaea* Thunberg, Prodr. Fl. Cap. 40. 1794. *Rapuntium pygmaeum* (Thunberg) C. Presl, Prodr. Monogr. Lobel. 22. 1836. *Laurentia pygmaea* (Thunberg) Sonder, in Harvey & Sonder, Fl. Cap. 3: 553. 1865. TYPE: South Africa. Cape Province: "Kapland, östliches Gebiet, in Querspalten des Berges Ribeck-Kastel," *Thunberg s.n.* (lectotype, designated by Wimmer (1953: 397), S not seen).

Wimmerella secunda (L. f.) L. Serra, M. B. Crespo & Lammers, comb. nov. Basionym: *Lobelia secunda* L. f., Suppl. Pl. 395. 1782. *Enchysia secunda* (L. f.) Sonder, in Harvey & Sonder, Fl. Cap. 3: 551. 1865. *Laurentia secunda* (L. f.) Kuntze, Revis. Gen. Pl. 3(2): 188. 1898. TYPE: South Africa. Cape Province: "Cap," *Herb. Linn. 1051.17* (lectotype, designated by Crespo et al. (1996: 119), LINN).

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Note added in proof. Because Article 37.3 was amended by adoption of Proposition 80 (Barrie, Taxon 47: 881–889. 1998) at the August 1999 International Botanical Congress, the names *Laurentia frontidentata* E. Wimmer and *L. mariae* E. Wimmer are validly published. They are the basionyms of the new combinations *Wimmerella frontidentata* (E. Wimmer) L. Serra, M. B. Crespo & Lammers and *W. mariae* (E. Wimmer) L. Serra, M. B. Crespo & Lammers, respectively.